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MODELS OF THE LEARNING SITUATIONS FROM THE POSITIONS OF THE THEORY OF ACTIVITY IN DIFFERENT TYPES OF TRAINING

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Розглядається ієрархічна структура моделей рівнів невизначеності й відповідної проблемності навчальних ситуацій з позицій теорії діяльності, досліджується продуктивне, розвивальне, особистісно зорієнтоване навчання з цих позицій.

Рассматривается иерархическая структура моделей уровней неопределенности и соответствующей проблемности учебных ситуаций с позиций теории деятельности, исследуется продуктивное, развивающее, личностно-ориентированное обучение с этих позиций.

Ключові слова: *діяльність, навчальна ситуація, модель навчальної ситуації, невизначеність і проблемність навчальної ситуації, продуктивне, розвивальне, особистісно зорієнтоване навчання.*

The article deals with the further development of the ideas of the authors which are enlightened in the papers [4, 5, 6] which are based on the ideas and positions of the scientific papers [1-10]. In particular, five levels of uncertainty of the learning situation and relevant five levels of the problematic questions of the learning situation were identified and investigated in [6]. Such five-leveled model allows the subject of teaching to simulate the level of uncertainty and the corresponding problematic learning situation, which is consistent with the concept of a teacher concerning the readiness of the pupils or students to the perceiving and solving specific learning situations of the defined scope, content, systematic complexity and defined by the subject of teaching problematic level. The essence of the scheme of the determination of the problemness of the learning situation given in [6] is based upon such a hierarchic model: the question to solve is defined as a problematic situation; the teaching problematic issue is formulated; the goal of solving of the educational problems is determined and formulated; partial goals of the educational problems are defined and formulated; the chain of actions (algorithmic prescription of the actions) for solving each partial purpose is defined; the ways of the performing of each action are determined; the algorithms of the performing of the operations for each action in accordance with the above mentioned ways are determined; the methods to perform the operations in each algorithm are defined; the tools to perform actions and operations are defined; methods of application of the steps and operations are determined; the algorithms of the operations with the help of the defined means (for example, certain information and communication technology) are performed and thus a chain of actions is performed as well as partial goals are achieved, and hence the goal of the learning situation is solved.

The pupils or students are provided with possibilities appropriate to the level of a problematic learning situation to build their own educational and academic trajectory. At the first level the students work in accordance with the algorithm for solving the learning situation determined by the subject of teaching; at the second level the subjects of the learning process have possibilities of choice or creation of methods and means of the fulfillment of the operations in the determined by the subject of the teaching algorithms; and the third level is characterized by the fact that the subjects of learning are able to find or create the ways to perform actions, to search for or create algorithms of the fulfillment of the actions, the ways of the usage of the means of the implementing of these algorithms (e.g., symbolic calculators in the manual or program mode) and thus the subjects of learning are involved in the meaning-creating factors (actions) for solving the learning situation; the fourth level provides an independent determination of partial objectives of the problematic situation, algorithmic prescriptions of the actions of their solution, methods and algorithms to perform actions, the means for their use in the performing of the actions and operations by the subjects of learning; on the fifth level of the problematic learning situation the subject of teaching defines the question to solve as a problematic situation and the subjects of learning independently formulate appropriate training problem and all the hierarchical system of its solution. It is clear that as higher the level of the problematic learning situation is, the more independently the subject of learning creates its own educational and learning trajectory.

Having based on the above mentioned scheme-model we'll try to interpret some important aspects of the educational process.

Productive learning on the contrary to the reproductive one is based upon the creation of the learning educational products by the subject of learning such as a new algorithm, artwork, a new way of solving problems, fulfillment of the actions and more. There is a possibility to design and implement either reproductive or productive studies of the structure of learning situations in terms of their uncertainty and the corresponding problematic situations in our scheme (see [6]).

Note that the products of the learning activities of the pupils or students will not be only those which are formed as a result of cognitive and creative activities within the academic subject, but the meta-subject products (for example, the methods for solving the system of linear equations using ICT), the products of the organizational activities (the relationships between the subjects of learning themselves and their interconnections with the subjects of teaching in solving educational problems, devising learning situation), products that have arisen in consequence of a decision based on the personal choice (own meanings and learning goals) and others in our scheme. These products were created by means of the individual and collective activities in the cooperation with the subjects of teaching and other subjects of learning. The products of the learning activities of the students or pupils could occur out of the educational establishment as a result of the interaction with other people who are not related to the institution (e.g., relationships with "other" people, creating products in the Internet, etc.). In other words, our scheme involves the creation of not only purely educational products by the subjects of learning, but also vital products which introduce the subject of learning in

interminable real life. Furthermore, this scheme provides the possibility of a purposeful activity of the pupils or students to enhance a learning situation towards the choice of a prospective profession, educational institution (for pupils), independent search of the pupils for the contact with universities, pupils' participation in different university programs (competitions, remote consultations with the teachers of universities, research work under the guidance of faculty members, Olympiads). It gives the possibility to the students to contact with the employers or agencies that can provide one with a job after graduating university, internship at the university adjusting one's personal educational goals with the focus on the prospective practice and encouraging the application of the organizational efforts to change the educational process at the university - including changes in the content, methods, techniques, forms of learning. Then motivated and established contacts with the "outside world" will be the products of the organizational activities of the students or pupils which motivate the subject of learning to adjust own views on education and actively participate in the creation of the learning process, learning situations for the purpose of the opportunities to earn knowledge (which are not ready to use) needed in the prospective particular professional activity, and not just "knowledge for knowledge." Note that the reproductive activity can not disappear because when creating new products much of the activity will be in the form of the reproductive operations by known algorithms.

The models of the learning situations should be open for expansion, foresee possibilities of the qualitative and quantitative expansion of their scope and content with new system complexity. On the other hand, depending on the specific conditions such models should include also narrowing of their scope and content, reducing of the system complexity up to the minimal integrative image of the learning situation (see [6]). Such a flexibility of the learning situation should have the maximum opportunity to consider the goals, objectives and benefits, individual characteristics of the students, pupils and teachers. The absence of desire of the students to cooperate with a teacher (not just deal!) in the educational situation shows their low professional orientation, not readiness to study at the universities of different levels and directions, their unwillingness to the targeted training with the purpose of the professional activity in a particular area or even in some institution according to its profile. Therefore, when choosing the topics of diploma or master's works, not to mention the coursework, there are no such criteria which are associated with the professional activity of a particular institution or at least with the specific focus of the prospective careers. Our scheme of creation and formation of the models of the learning situations allow to change their structure, scope, content, system complexity in general, to open for the students and professors or pupils and teachers the entrance into the meta-subject sphere even out of the educational institution. Creating of different presentations, writing essays, implementing of various projects are the ways to the state of meta-being for a pupil or a student, a teacher or a lecturer relatively to the typical learning situations.

Nowadays the developmental study is fairly widespread (D.B.Elkonin, V.V.Davydov, I.S.Yakymanska, O.V.Bondarevska). It is based on the idea of L.S.Vyhotskyi according to which training should lead the development of the individual of a pupil or student, and in this sense it should be primary in relation to a

personality development. The development of the personality of a student or a pupil should be based on their individual capabilities. Taking it into consideration study as the "vanguard" of the development of a personality must rely not only on the already existing student's ability to solve certain tasks (in learning situations in general) fully independently, but also on those mental functions that are just emerging and then to accelerate the formation of such functions the subjects of teaching and the subjects of learning should confer together to solve the problem (in the general educational situation). L.S.Vyhotskyy introduces the concept of the zone of active development (self-activity of the subject of learning) and the zone of near development (compatible activity) for it. The main task of the area of near development is the formation of a student's 'tomorrow' ability to self-solve those tasks which one can not still solve today. Our scheme is provided with the model of learning situation with such a level of uncertainty and the corresponding problemness which can give an opportunity for the creation of the zone of the active development as well as for the near development zones depending on the specific learning situation – to be more precise, relevantly to the conditions of its formation and solution [6]. For example, during the first lesson the students with their master teacher learn the method of a sequential exclusion of variables for solving the systems of linear equations, and during the second one ("tomorrow" according to L.S.Vyhotskyi) they already carry out appropriate actions by themselves (the new mental functions of a pupil have been already formed), i.e. the actions have already become the operations for them.

Modern life is rapidly changing; there are a lot of new life situations which require new approaches, methods and ways of solution. To be ready for life an individual (a student, a pupil) should be provided with a sufficient quantity and quality of knowledge in order to generate the appropriate skills and abilities. Traditional forms of teaching form pupils' or students' willingness to resolve known typical learning situations by the known methods, ways and forms that were mentioned by the Club of Rome in 1979. It is clear that the typical learning situations, known and polished techniques, methods, forms of their solutions provide an adequate methodological structuring of a new educational material, and comply with the general pedagogical and didactical principles have allowed us to provide the subjects of learning with an adequate quantity and quality of knowledge for decades. According to such a study the subjects of learning develop themselves mainly due to new items of the learning activities (e.g., graphs, functions, equations, inequalities, new concepts, etc.) that appear in the study of all new and new teaching material. The development of a student or a pupil is concerned as the process of the internal change of one's physical, psychological and spiritual forces which ensure the realization of the potential and life purposes [3 p. 34]. Educational activity of a pupil or student is mainly cognitive due to the learning of a new teaching material (new items of educational activity) by known methods, ways in traditional teaching. However, techniques, methods, forms, training tools change very slowly, delaying the development of personalities of the participants of the pedagogical process. Integrative methods, ways, forms of learning, particularly of the meta-subject nature emerge and are implemented very slowly. The very inter-subject and extensive integration of methods, forms and means of training, knowledge, experience of the

subjects of learning has not been still developed by the scientists and hasn't been implemented in real learning process at school or university. Our scheme of modeling and shaping of the learning situation provides the educational process with the opportunities to do it, including the ability to use modern ICT in teaching mathematics or other disciplines (integration of mathematics and computer science). However, a teacher should transform opportunities into reality that requires fairly intense cognitive, creative and organizational efforts of the subjects of teaching and learning.

Person-oriented teaching is primarily characterized by the training activities of pupils or students. Training activities besides knowledge, skills involve the motivation of the subjects of learning to study, its values, evaluating of not only the level of learning and the level of skills, but also evaluating of the changes of quantitative and qualitative growth of knowledge and skills, creativity and spent efforts, emotional and volitional characteristics, etc. Person-oriented teaching involves the formation of competencies, personal traits of the pupils or students that may not directly relate to a particular topic and solve relevant learning situation. Learning situations with different levels of uncertainty and different levels of problemness are modeled and shaped in our scheme for this study. If the subjects of learning are involved in the goal formation; in the determining of the prescriptions of the actions to achieve partial goals; in choice of learning activities and creation of the methods of their use in learning; in creation of the subjects to learn as "meta-subjects", i.e. the subjects created as a result of the integration of different disciplines; in the independent decisions regarding the choice of content, methods, techniques, forms, training, correcting of the entire educational process according to their own learning goals, than the students and pupils are being formed as the subjects of the learning activity (they are not passive objects of influence). In addition to that the pupils and students are active and determined to achieve their own goals of study, preferences and tastes. They apply cognitive, creative and organizational efforts to implement them in training activities, feel responsibility for their actions, initiatives, products of learning.

The author of this article conducted a long experiment with the students of Physics and Mathematics Faculty while teaching differential equations. The very subject was primary in the traditional teaching; the personality of a student was on the first place in the person-oriented learning. The experiment showed that the main reason of poor performance was not low mathematical schooling, not lazy students, not the lack of desire to learn, that is often stressed by teachers, but low formation of the personality of the student. Not feeling life as infinitely possible reality, not seeing own place in life, inability and even unwillingness to define own life orientation, inability to evaluate own ability to fill a certain position in life, inability to evaluate unknown situation critically and self-critically , not seeing the role of qualitative education in human life inhibit the activity of the students during the classes, show their reluctance to define own objectives of study, the reluctance to self-realize one's capabilities, inability and unwillingness to assess them critically, but vision of own responsibility for training activities as a primitive - "not to get a bad grade" is the fundamental reason of low students' achievement. If to add features and advantages of the traditional methods and forms of teaching, then the

students have neither capacity nor motivation to personality development in the walls of the university, and moreover, they develop themselves as individuals primarily outside of the institution (especially senior students).

Giving to the students freedom to create learning situations according to our scheme one can provide advanced training opportunities, study at its own pace, choosing problematic learning situation that created a new, different from the traditional, academic situation. On the one hand the students are given the opportunities to choose their own actions, their own learning pace, etc., and on the other – they are given the new requirements: the mandatory minimum for study of the integrative image of the learning situation, the mandatory release in the meta-subject activity, the mandatory search and decision with the selection and implementation of various projects and presentations. There are new problems for the teacher. So during the classes the students are provided with freedom (freedom of expression ideas, thoughts, communication) that can led to the emergence of the working noise which can surpass a certain threshold and spoil the class. However, providing freedom of the realization of one's thoughts, ideas, actions and motivations, extortion of the individual actions (they were evaluated at every class) transformed the students from the passive objects who were willing to assimilate knowledge into the active subjects acquiring knowledge.

The knowledge of the subject, skills and abilities of a pupil or student are evaluated in the traditional teaching. For example, during the study of systems of linear equations the efforts of the subject of learning can not be usually considered in the use of ICT (automated operations, creating ways to perform actions and corresponding algorithms, etc.). The independent homework did not provide such use. When we want to provide personalized, faster, developmental, individual oriented from the "life" activities learning, it creates a very different educational environment for the subjects of learning as well as for the subjects of teaching in which a student or a pupil are provided with the opportunities for the meta-subject activity that brings one outside of the school into a new space of the communication with "other people." Thus the subjects of learning will have completely new subjects of their activities not only from a specific discipline, as it has been mentioned above. Consequently, there is a need in the assessment of the study of a student or a pupil in a broader context. Therefore, the assessment of the study of a student or a pupil will depend on the scope, content and system complexity of the learning situation. At the lowest level of a problematic learning situation it is possible to assess the level of knowledge, abilities and skills of a student or a pupil while solving a learning situation. In educational situations with higher problematical level it is necessary to assess various student's efforts, including organizational, scope and content of the selected learning situation, creativity while solving it, personal contribution to the creation and solution of the learning situation and others. The problem is not only in the choice of criteria for the evaluating of the learning situation, but also in the construction of a vector model of the grades to a scalar evaluation, for example, such a model can be a weighted average model, where the weight coefficients are determined with the help of the expert way. It is important for the subjects of learning to be given the opportunity to discuss about the general grade given by the

subject of teaching. Methodology of the evaluation of the educational activities of students or pupils hasn't been highlighted enough in the scientific literature.

Taking into consideration the above mentioned material concerning the learning situation in today's learning process the following statements can be argued:

- There should be the consistency of learning objectives, which a teacher or an instructor puts and personal goals of students or pupils;
- The models of the learning situation must be flexible and be able to its expansion and narrowing;
- The expansion of the model of the learning situation should provide output of the subject of learning into the meta-subject and life space;
- The learning situation must ensure the individual pace of learning for pupils or students;
- The subjects of learning should be given the possibility to adjust the content and structure of the learning situation based on their personal learning goals;
- The subjects of learning must be able not only to solve the training situation according to the proposed scenario, but also to create learning situations together with the subject of teaching;
- Real new educational products of the pupils or students must be the results of their learning;
- The learning situation in terms of problemness, scope, content and complexity of the system should be consistent with the real possibilities of the subjects of learning, which is one of the hallmarks of pedagogical skills of the subject of teaching;
- The students and pupils should be able to build their own educational path within the educational space, created under the guidance of a teacher;
- The subject of learning should have the right to influence upon the choice of methods, techniques, means and forms of education that best meet one's personal goals;
- The assessment of students' learning on the conditions of freedom of choice, their taking part in the creation of a required learning situation should consider their cognitive, creative and organizational efforts and related costs of time, etc.;
- Advanced training methods selected by the subject of teaching (e.g., the classifications by I.Ya.Lerner, M.N.Skatkin [7]) should be "lived" in the learning situation, i.e., they should be filled with a specific content according to the specific concepts of a discipline;
- The teacher should first work with a personality of a student, create conditions for its formation and development, and in the second turn he should teach certain subjects in the context of personal development; this is the main value-orientation of the training situations;
- Training both in general and under the conditions of the right of choice-correction of the learning contents, methods, means and forms of education, the right for the forming of the learning situations compatibly with the teaching of subjects, can not be restricted by just only reproductive or productive study, can not be only individually oriented, can not be only heuristic or just research and a lot of "not only". Each approach, method, tool or form of the training is implemented in a

specific learning situation, in which they are both advantages and limitations that require the "polyphony" of the learning process.

The article will be useful for school teachers and teachers of higher educational institutions, Methodists, students, undergraduates and to all those who seriously want to deal with the problems of modern education.

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